OBJECTIVES
The assessment of intracranial structures especially in cases with enlarged ventricles has been done with measurement of biparietal diameter (BPD), and atrial width. However, between 11 and 20 weeks of gestation, BPD is only 16.0mm to 49.1mm and it is questionable to evaluate enlarged ventricles by AW measurement in the first and early second trimesters. Furthermore, by 2D ultrasound, the plane for AW measurement is not always the same cutting section. We measure the distance and volume of intracranial structure by utilizing TV 3D neurosonography.

METHODS
A total of 350 normal cases (35 for each gestational week) between 11 and 20 weeks were enrolled and Voluson E10 with 6-12MHz transvaginal probe (GE healthcare) was used in this study. Whole brain volume dataset was used. Volumetry of intracranial cavity volume (ICV), left and right lateral ventricle volume(VV) and choroid plexus volume(CPV) were calculated by VOCAL with manual 15-degree rotation. VOR(%)= VV/ICVx100. Reference equations for each value for gestational age were constructed.

RESULTS
ICV, VV and CPV increased according to advancing gestational age and VOR decreased. Atrial width (AW) is increasing from 11 to 18 weeks of gestation and the peak of AW was 8.25mm at 18 weeks. We have several cases over AW 10mm in our normal series of cases.

CONCLUSIONS
Owing to advanced 3D ultrasound technology, It is time for us to develop the way for accurate assessment of early ventriculomegaly.

FIGURE 1. VOCAL measurements of Intracranial volume (upper), Ventricular Volume (middle), and Choroid Plexus volume (lower) at 15 weeks.

FIGURE 2 Intracranial volume, Ventricular Volume, VOR, AW and Choroid Plexus volume between 11 and 20 weeks.
ICV : \( y = 0.6723x^2 - 13.438x + 69.651 \)
VV : \( y = 0.3696e^{0.1139x} \)
VOR : \( y = 815.68x - 3.262 \)
CPV : \( y = 0.0312x^{1.2696} \)
AW : \( y = -0.0238x^2 + 1.0811x - 3.7472 \)